

- Input for solar cell with MPPT tracking
- reverse current protection.
- Temperature measurement
- DC/DC controlled using PWM from CPL to create MPPT function

Termistor for monitoring will be bypassed with EN signal from MCU

TP201

Term

V term set to 60% -> charging is always ON

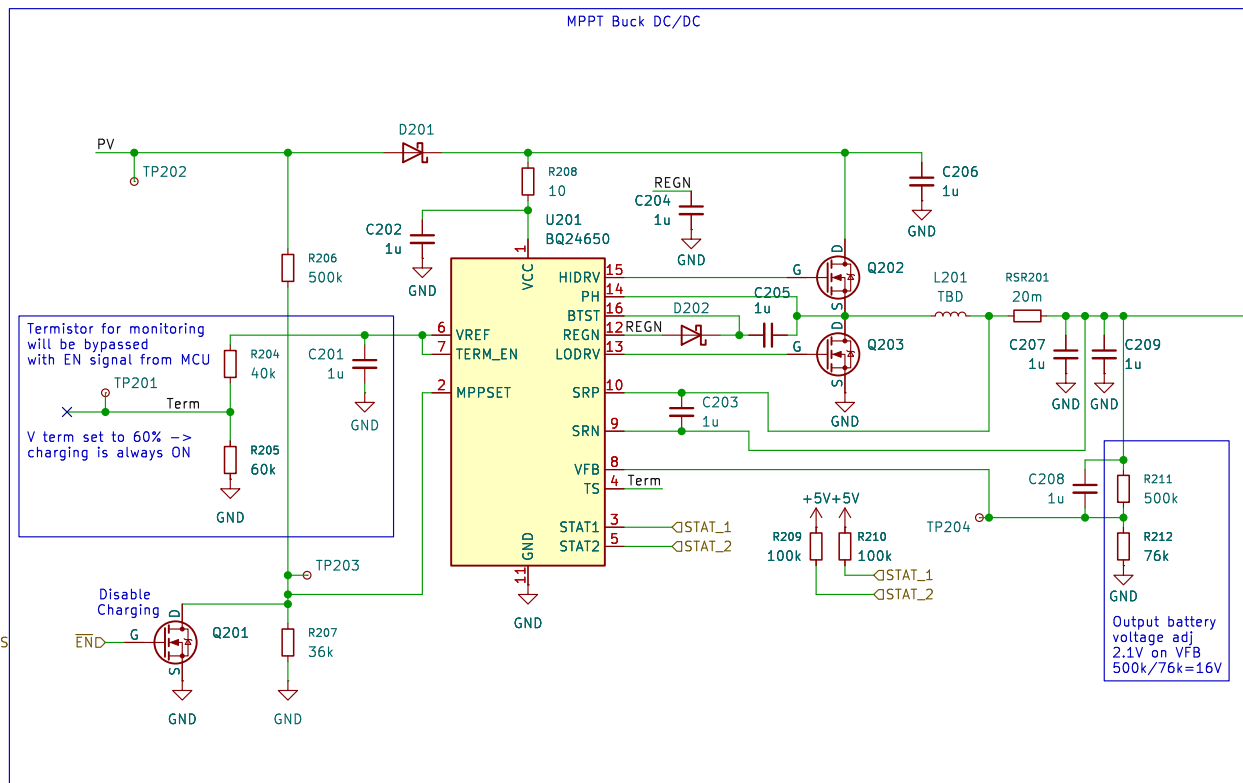
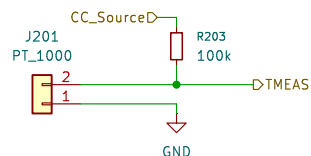
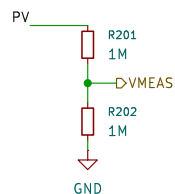
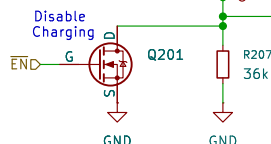
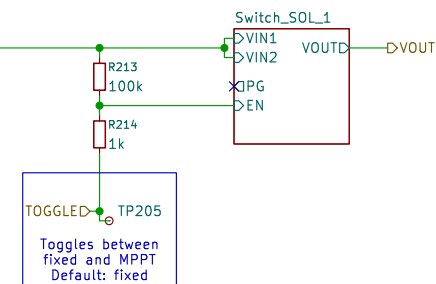
R204 40k

R205 60k

GND

C201 1u

GND

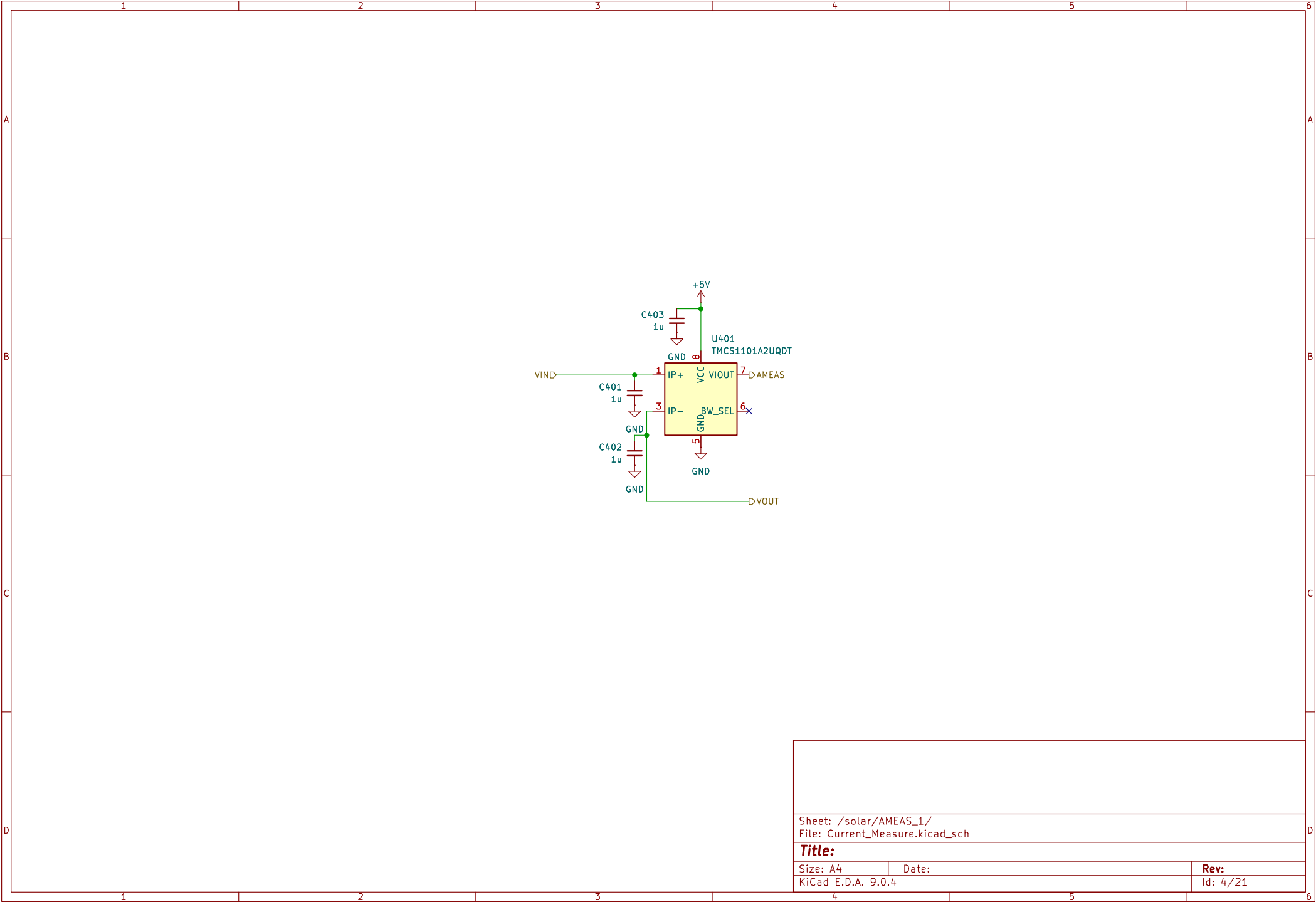

$$I_{\text{CHARGE}} = \frac{40 \text{ mV}}{R_{\text{SR}}}$$
$$I_{\text{PRECHARGE}} = \frac{4 \text{ mV}}{R_{\text{SR}}}$$

$$V_{MPPSET} = 1.2 \text{ V} \times \left[1 + \frac{R3}{R4} \right]$$

$$V_{BAT} = 2.1 \text{ V} \times \left[1 + \frac{R2}{R1} \right]$$

where

- R2 is connected from VFB to the battery
- and R1 is connected from VFB to GND

Rev:
Id: 2/21



Inputs	Outputs
Input voltage	Output voltage
Input from CPU	

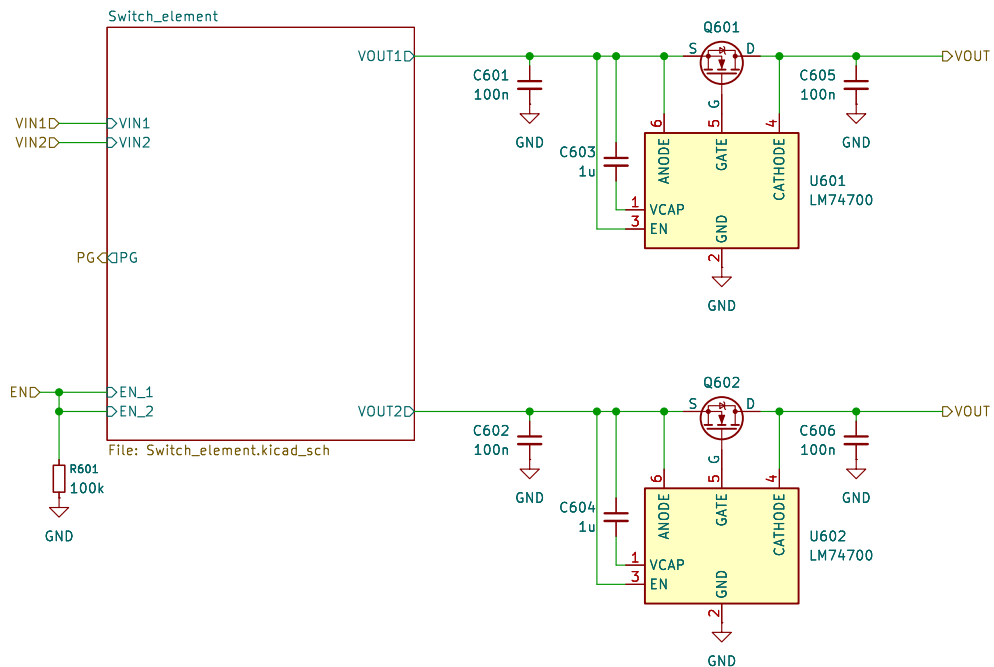
dedikovaný ideal diode IC

Generic Switch

soft current limit – software
hard current limit – Resistor

kalibrace ADC mereni proudu

hot/cold redundancy
hot – 1 enable automatic
cold – 2 enables manual



Sheet: /solar/Switch_SOL_1/
File: Switch_H.kicad_sch

Title:

Size: A4

Date:

KiCad E.D.A. 9.0.4

Rev:

Id: 6/21

- Candidates
- 6A

TPS281C30ERGWR

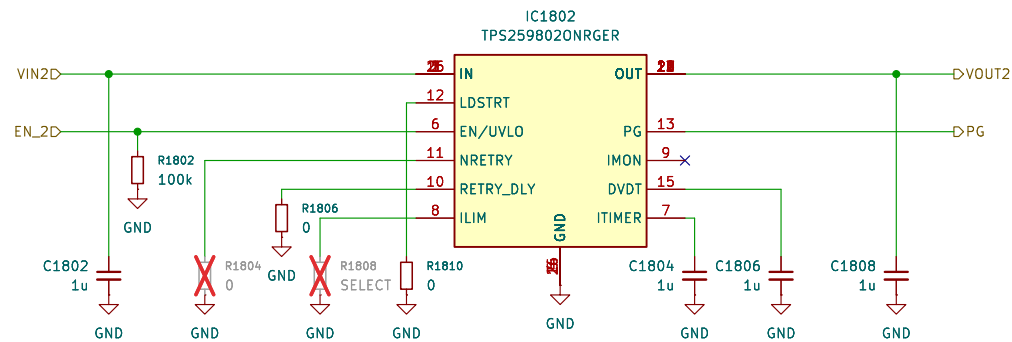
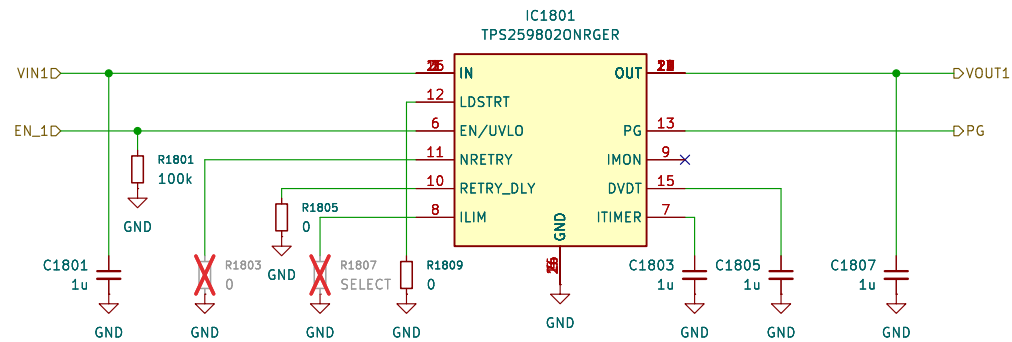
TPS25910RSAR

TPS1H200A-Q1 – too much Ron
- TPS259802
- 10A

TPS1685

TPS25983

LTC4226
- TPS25983



Sheet: /solar/Switch_SOL_1/Switch_element/
File: Switch_element.kicad_sch

Title:

Size: A4

Date:

Rev:

KiCad E.D.A. 9.0.4

Id: 16/21

Inputs	Outputs
Input voltage	Output voltage
Input from CPU	

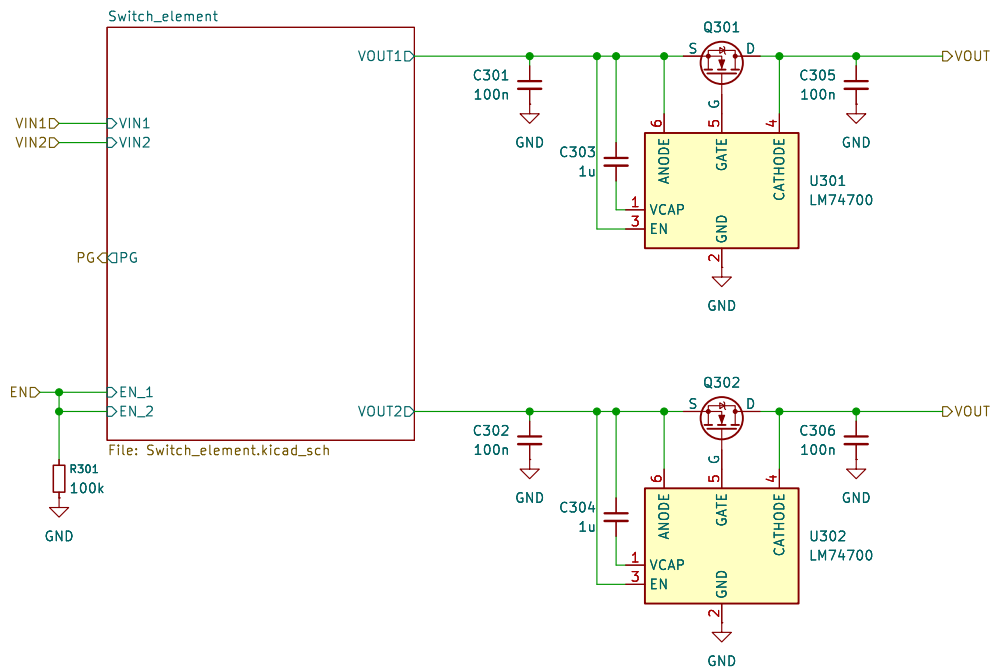
dedikovaný ideal diode IC

Generic Switch

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Sheet: /switch1/
File: Switch_H.kicad_sch

Title:

Size: A4

Date:

KiCad E.D.A. 9.0.4

Rev:

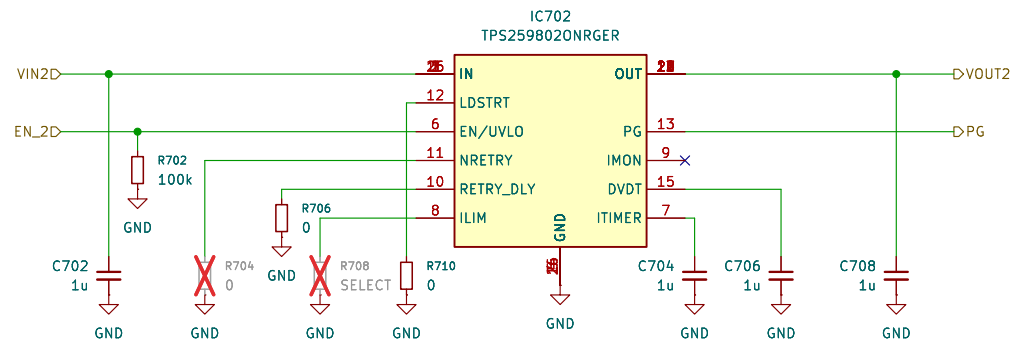
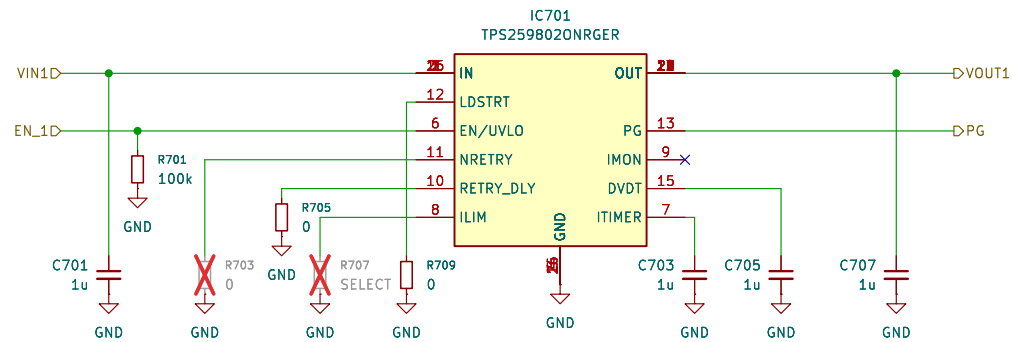
Id: 3/21

Candidates
6A
TPS281C30ERGWR
TPS25910RSAR
TPS1H200A-Q1 - too much Ron

TPS259802

10A
TPS1685
TPS25983
LTC4226

TPS25983



Sheet: /switch1/Switch_element/
File: Switch_element.kicad_sch

Title:

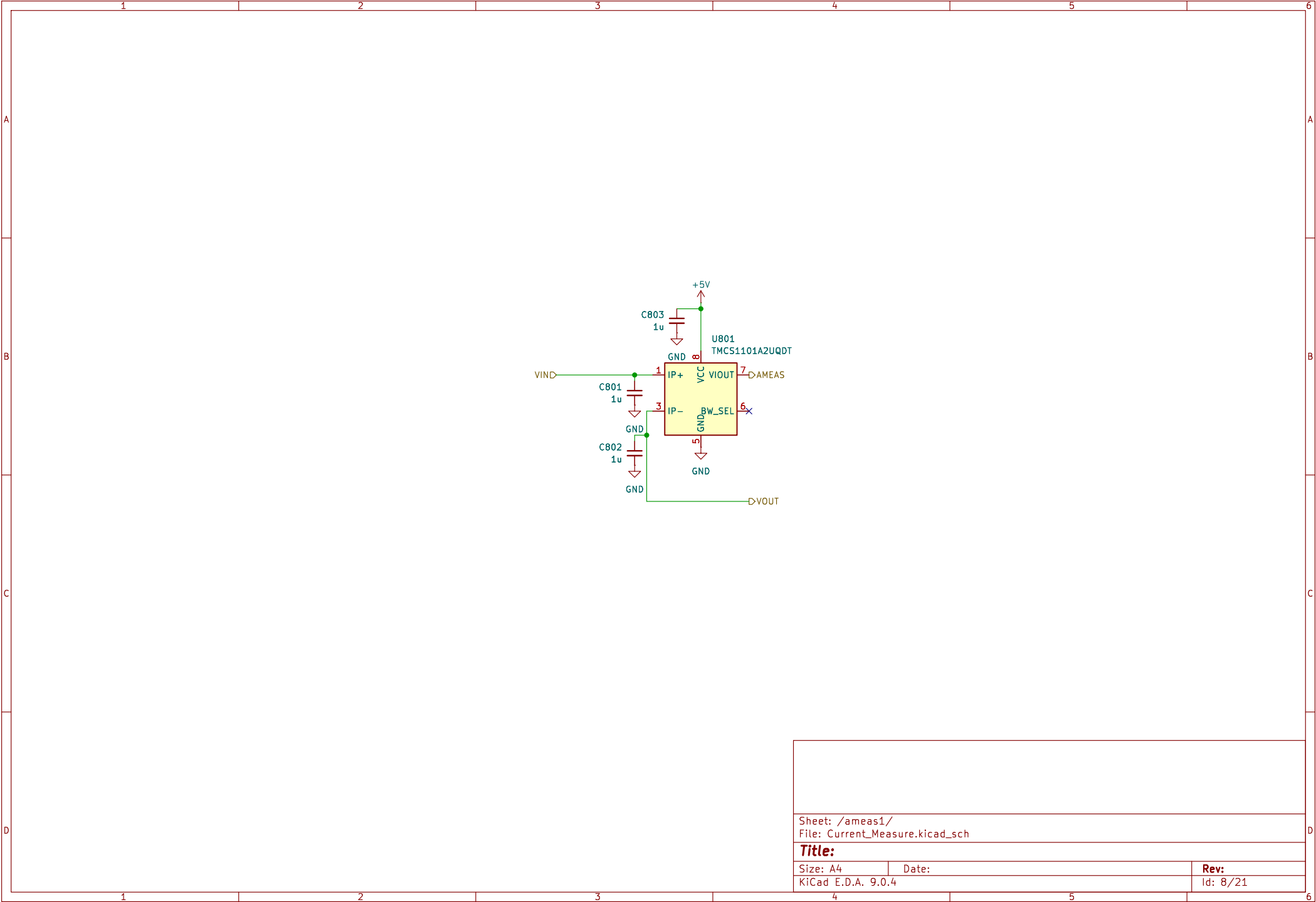
Size: A4

Date:

Rev:

KiCad E.D.A. 9.0.4

Id: 7/21



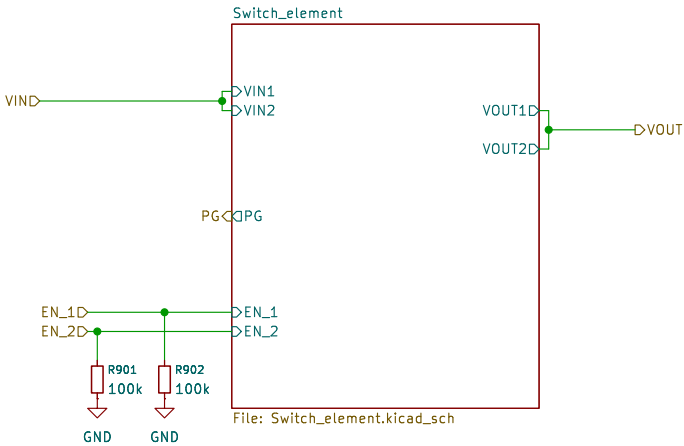
Inputs	Outputs
Input voltage	Output voltage
Input from CPU	

Generic Switch

soft current limit – software
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Sheet: /switch_c1/ File: Switch_C.kicad_sch		
Title:		
Size: A4	Date:	Rev:
KiCad E.D.A. 9.0.4	Id: 9/21	

- Candidates
- 6A

TPS281C30ERGWR

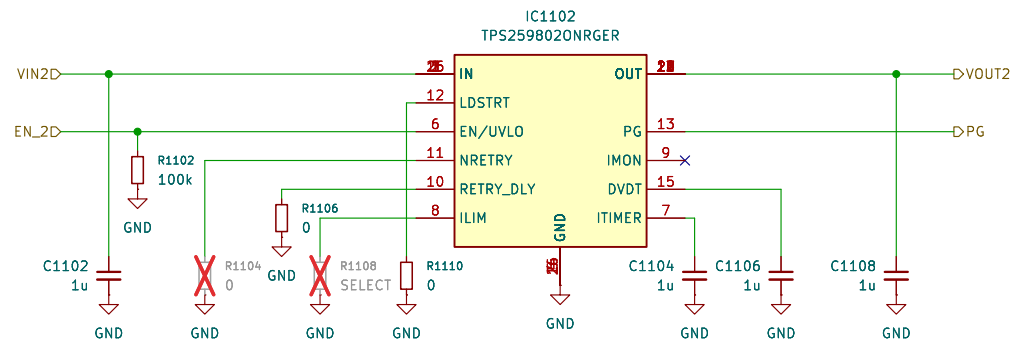
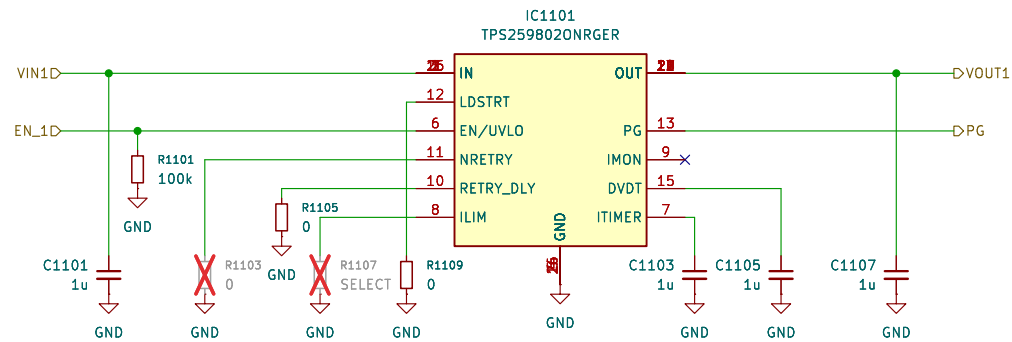
TPS25910RSAR

TPS1H200A-Q1 - too much Ron
- TPS259802
- 10A

TPS1685

TPS25983

LTC4226
- TPS25983



Sheet: /switch_c1/Switch_element/
File: Switch_element.kicad_sch

Title:

Size: A4

Date:

Rev:

KiCad E.D.A. 9.0.4

Id: 11/21

Inputs	Outputs
Input voltage	Output voltage
Heater Enable	Measured voltage
4S battery	Measured current
	Temperature of the Cell
	Temperature of the charger (not sure)

Input for Battery cell with balancing circuit
Temperature measurement of the battery
Heater for maintaininig battery temperature

CC_Source

CC_Source

File: CC_Source.kicad_sch

J1001
PT_1000

R1001
100k

TMEAS

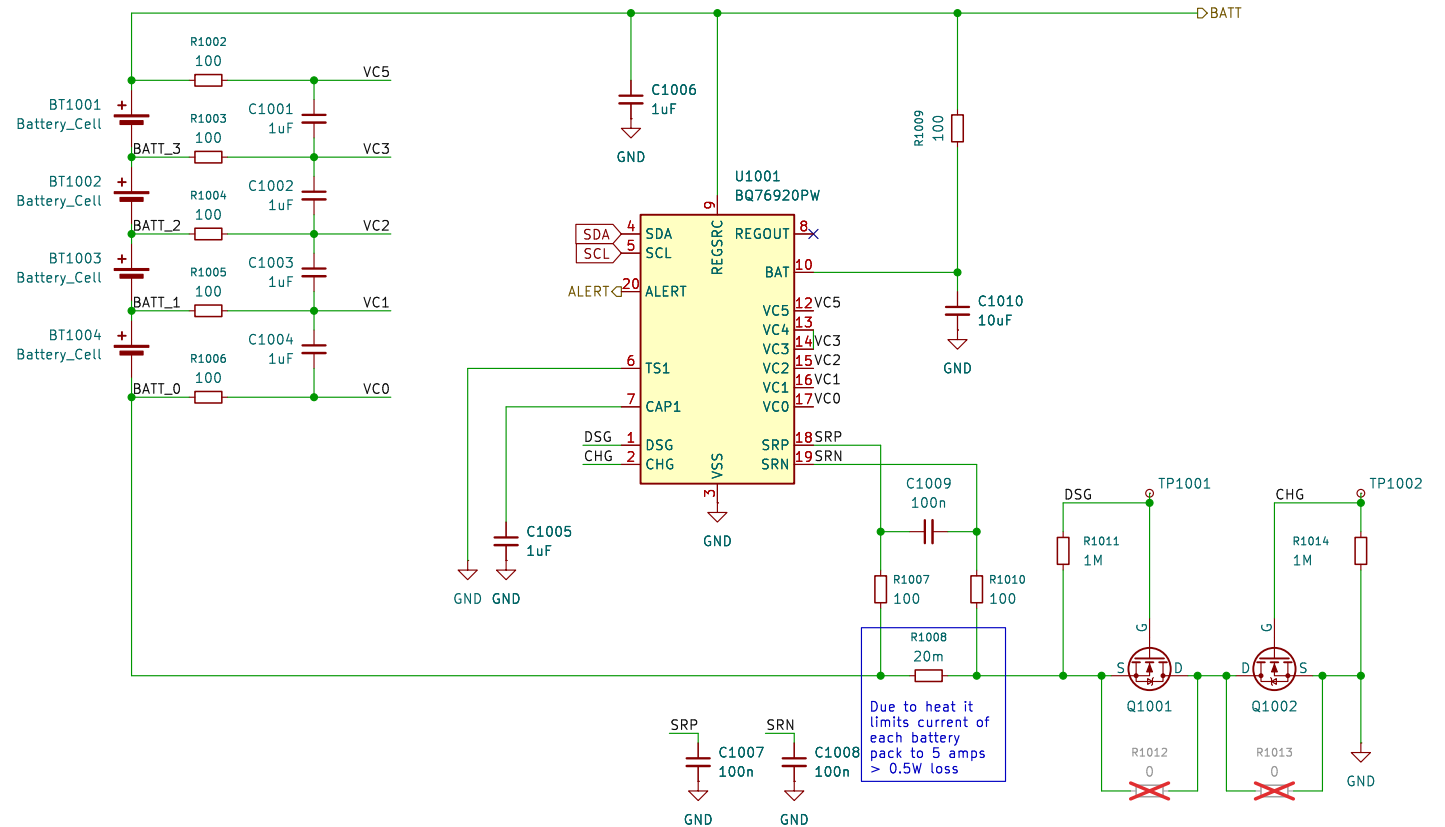
GND

Switch_Batt_Heater

BATTD VIN1
VIN2 VOUTD
PG XPG
Heater_END EN

File: Switch_H.kicad_sch

Power that charges the batteries is regulated
by MPPT in SOL



Sheet: /battery/
File: Battery_Cell_Input.kicad_sch

Title:

Size: A4

Date:

KiCad E.D.A. 9.0.4

Rev:

Id: 10/21



Inputs	Outputs
Input voltage	Output voltage
Input from CPU	

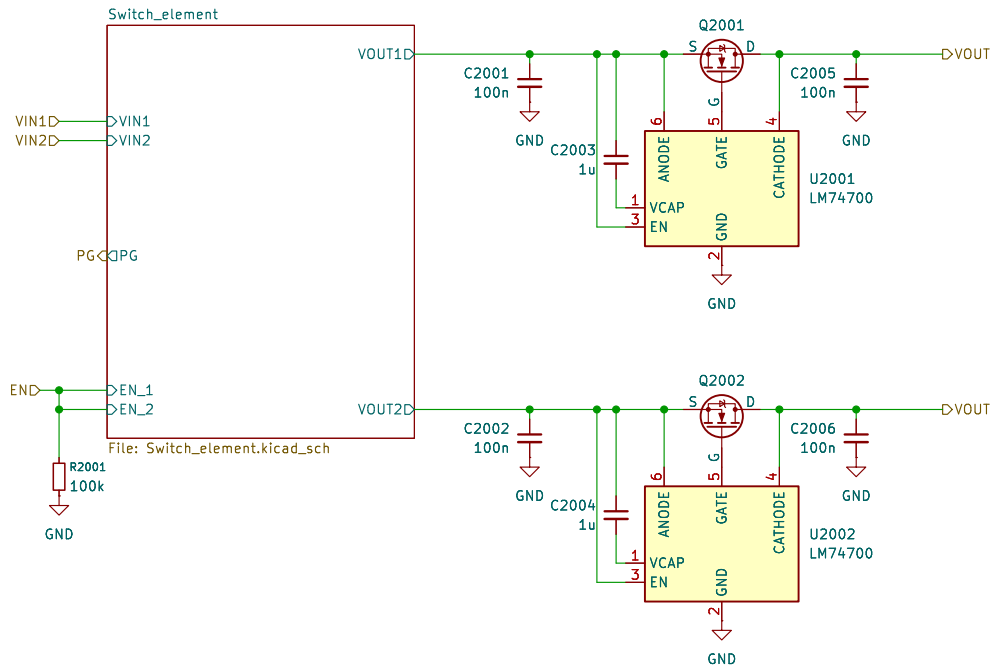
dedikovany ideal diode IC

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Sheet: /battery/Switch_Batt_Heater/
File: Switch_H.kicad_sch

Title:

Size: A4

Date:

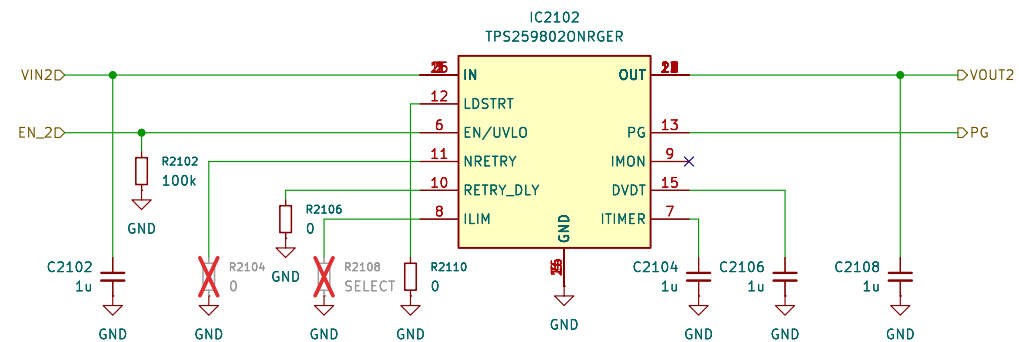
KiCad E.D.A. 9.0.4

Rev:

Id: 18/21

6A
TPS281C30ERGWR
TPS25910RSAR
TPS1H200A-Q1 – too much Ron

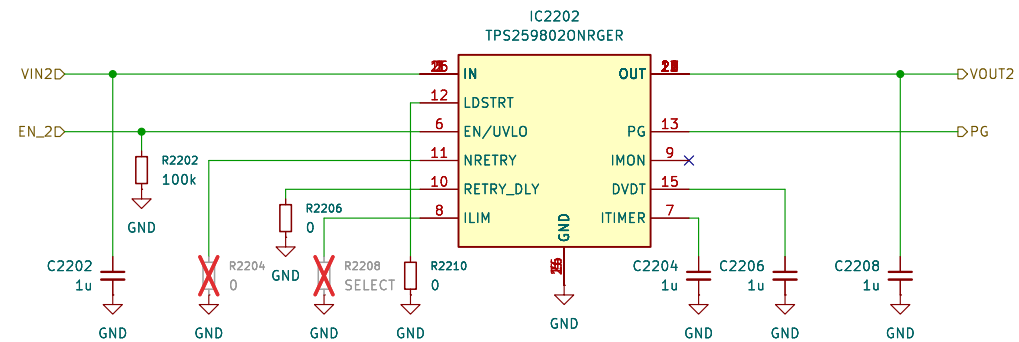
10A
TPS1685
TPS25983
LTC4226

[illegible]

Id: 19/21

6A
TPS281C30ERGWR
TPS25910RSAR
TPS1H200A-Q1 – too much Ron

10A
TPS1685
TPS25983
LTC4226
TPS25983



Id: 20/21

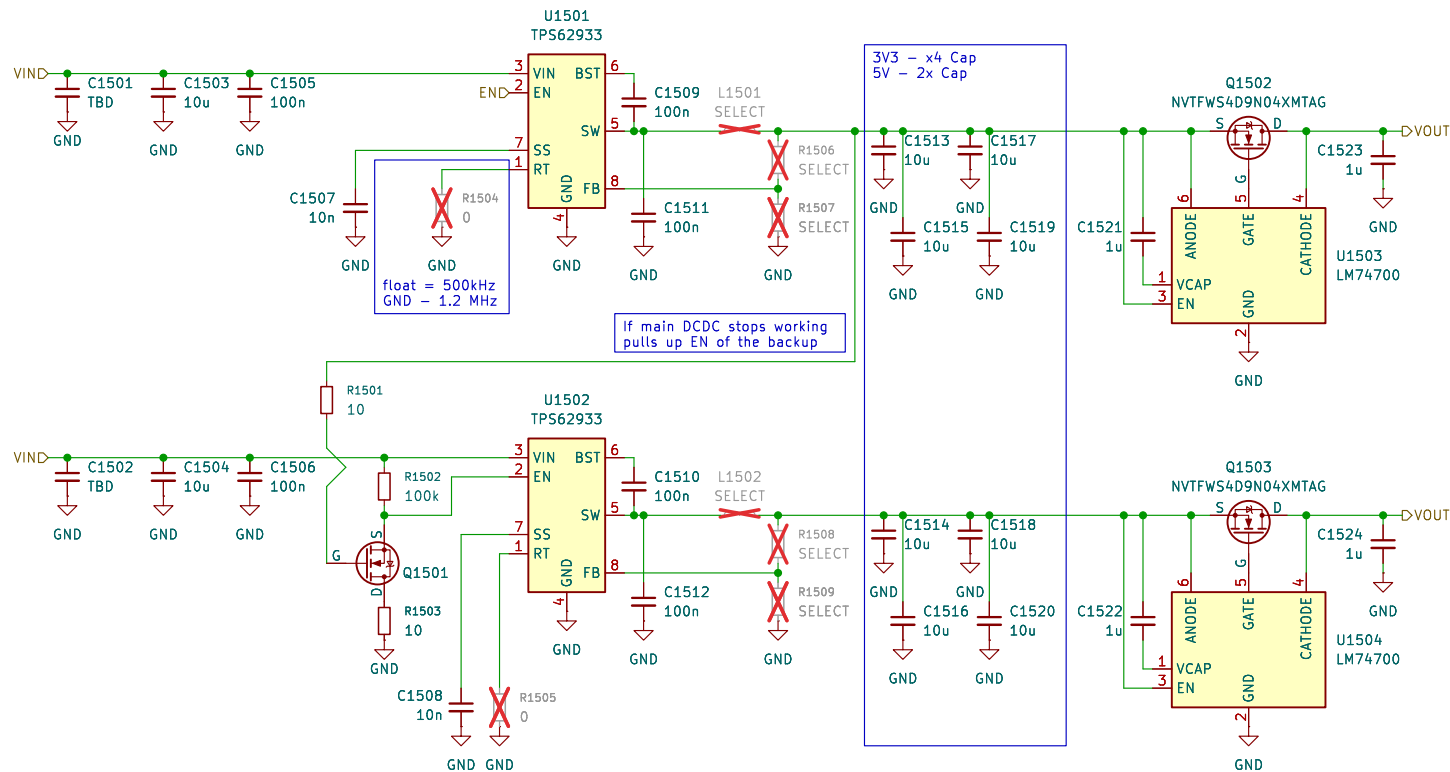
Inputs	Outputs
BUS Voltage	5V

2A

$$I_{IN_RMS} = I_{OUT} \times \sqrt{\frac{V_{OUT}}{V_{IN_MIN}} \times \frac{V_{IN_MIN} - V_{OUT}}{V_{IN_MIN}}}$$

Use Rxx03 and Rxx00 to select output voltage

Output voltage
5V
 $10000 \times (5V - 0.8) / 0.8 \Rightarrow R_{xx03}, R_{xx00} = 52500$



Sheet: /dcdc/
File: DCDC_ADJUCTABLE.kicad_sch

Title:

Size: A4

Date:

KiCad E.D.A. 9.0.4

Rev:

Id: 16/21

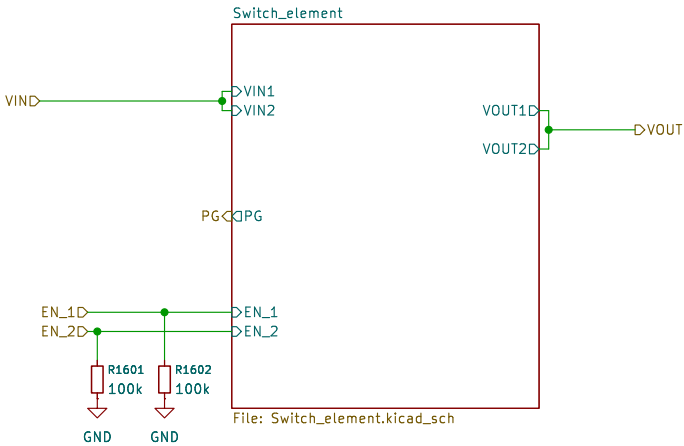
Inputs	Outputs
Input voltage	Output voltage
Input from CPU	

Generic Switch

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Sheet: /switch_c/
File: Switch_C.kicad_sch

Title:

Size: A4

Date:

KiCad E.D.A. 9.0.4

Rev:

Id: 17/21

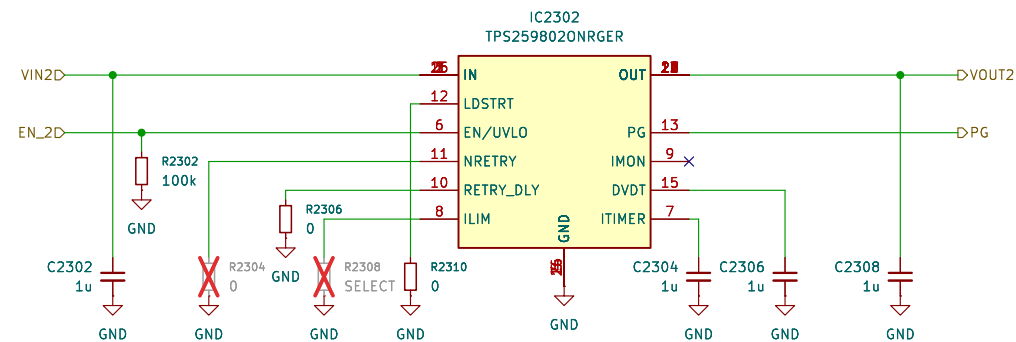
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TPS25983
LTC4226

TPS25983



Title:		
Size: A4	Date:	Rev:
KiCad E.D.A. 9.0.4		Id: 21/21

